

Listing of Claims

1 1. (Currently Amended) A method of amplifying an ~~optical~~ polarized input beam ~~with a~~
2 ~~number of spaced, optical amplifier slabs, with the slabs having two opposed~~
3 ~~surfaces through which the beam is passed, comprising the steps of:~~
4 ~~aligning at least four amplifier slabs~~ spaced from adjacent slabs, each of the slabs
5 ~~having a thickness dimension of not more than 0.31 centimeter, spaced~~
6 ~~from adjacent slabs, wherein the slab surfaces~~ of the at least four slabs are
7 ~~rendered essentially non-reflective by being placed within about 1 degree~~
8 ~~of the Brewster angle with respect to the polarized optical input beam, and~~
9 ~~wherein no two of the slab surfaces are within 0.1 degree of parallel~~ with
10 respect to each other;
11 ~~optically pumping the~~ at least four slabs; and
12 ~~passing a~~ the polarized input beam through the slab surfaces, wherein the
13 polarized input beam is optically amplified in the at least four slabs, ~~and~~
14 ~~wherein the input beam is of an eye safe wavelength, whereby controlling~~
15 ~~reflections and the use of multiple relatively thin slabs to reduce slab~~
16 ~~temperature greatly increases efficiency, and the high efficiency together~~
17 ~~with an eye safe beam wavelength makes the system commercially~~
18 ~~practical for use outside of research laboratories.~~

1 2. (Currently Amended) The method of claim 1, ~~wherein the beam is passed through at~~
2 ~~least four slabs and passed within about 1 degree of a Brewster angle of the slab~~
3 ~~surfaces, wherein half of the slab~~ slab surfaces are ~~slanting~~ slanted in one

4 direction and half of the ~~slabs~~slab surfaces ~~have~~are slanted in an opposite
5 ~~slant~~direction, ~~wherein using the~~ opposite slanting ~~slabs~~slab surfaces ~~avoids being~~
6 configured to control beam spreading in of the an output beam.

1 3. (Currently Amended) The method of claim 1, wherein the at least four slabs are
2 comprise Cr:YAG slabs.

1 4. (Currently Amended) The method of claim 1, ~~wherein further including passing~~
2 cooling fluid ~~is passed~~ between the at least four slabs.

1 5. (Currently Amended) The method of claim 1, wherein the slabs surfaces ~~being~~
2 ~~rendered~~include essentially non-reflective by dielectric surface coatings, and by
3 ~~being placed within about 1 degree of the Brewster angle with respect to the~~
4 ~~polarized optical input beam.~~

1 6. (Currently Amended) The method of claim 1, ~~wherein further including pumping the at~~
2 least four slabs ~~are pumped directly by using~~ pump diodes.

1 7. (Currently Amended) The method of claim 1, wherein ~~the beam is passed through the~~
2 ~~slabs within about 1 degree of a Brewster angle with all the~~ at least four slabs are
3 tilted in the a same direction and such that a cross-sectional area of a line shaped
4 beam is reduced during amplification. ~~a line shaped beam is entered into the~~
5 ~~amplifier, and spread into an area during amplification, and the area of the output~~
6 ~~beam is then optically reduced.~~

1 8. (Currently Amended) The method of claim 1, wherein the polarized input beam has a

2 wavelength of between 1400 and 1800 nm.

1 9. (Currently Amended) The method of claim 1, wherein the thickness dimension is less
2 than 2-3 millimeters.

1 10. (Currently Amended) A method of amplifying ~~an a polarized optical input beam with~~
2 ~~a number of spaced, optical amplifier slabs, with the slabs having two surfaces~~
3 ~~perpendicular to a thickness dimension~~, comprising the steps of:
4 aligning at least two optical-amplifier slabs separated by an intervening space,
5 each optical-amplifier slab having two slab surfaces approximately
6 parallel to each other and each optical-amplifier slab having a thickness
7 dimension of less than one centimeter, ~~having a thickness dimension of~~
8 ~~less than one centimeter, with surfaces parallel to, and spaced from~~
9 ~~adjacent slabs, and with the~~ slab surfaces being rendered essentially non-
10 ~~reflective by being placed disposed at the approximately a Brewster angle~~
11 with respect to a polarized optical input beam;
12 optically pumping the optical-amplifier slabs; and
13 passing the polarized input beam of an eye-safe wavelength through the slab
14 ~~surfaces wherein the beam is optically amplified in the slab~~ to amplify the
15 polarized input beam.

1 11. (Currently Amended) A method of amplifying an optical beam ~~with a number of~~
2 ~~spaced, optical amplifier slabs with the slabs having two opposed surfaces,~~
3 comprising the steps of:
4 aligning at least four optical-amplifier slabs, each of the optical-amplifier slabs

5 having two opposed slab surfaces that are substantially perpendicular to
6 having a thickness dimension, the thickness dimension being of less than
7 one centimeter, the slab surfaces of a first of the four optical-amplifier
8 slabs being substantially parallel slightly non-parallel to slab surfaces of an
9 adjacent member of the four optical-amplifier slabs, and the first of the
10 four optical-amplifier slabs being separated by an intervening space from
11 the adjacent member of the four optical-amplifier slabs spaced from
12 adjacent slabs, wherein the slab surfaces are rendered being essentially
13 non-reflective;
14 optically pumping the optical-amplifier slabs; and
15 passing an input the optical beam through the slab surfaces wherein to amplify the
16 optical beam, is optically amplified in the slabs, and wherein the input
17 optical beam is of being of an eye-safe wavelength.

1 12. (Currently Amended) The method of claim 11, wherein ~~no two~~ the slab surfaces of the
2 first of the four optical-amplifier slabs of the slab surfaces are precisely not within
3 0.1 degree of being parallel to each other and are not within 0.1 degree of being
4 parallel to the slab surfaces of other members of the four optical-amplifier slabs.

1 13. (Currently Amended) The method of claim 11, wherein ~~the slabs have a~~ the thickness
2 dimension of each optical-amplifier slab is of less than 3 mm and a diameter of the
3 slab surfaces is at least 5 mm.

1 14. (Currently Amended) The method of claim 11, wherein the optical beam has a
2 wavelength of between 1400 and 1800 nm.

1 15. (Currently Amended) The method of claim 11, ~~wherein further comprising pumping~~
2 the at least four optical-amplifier slabs ~~are pumped directly by using pump diodes.~~

1 16. (Currently Amended) The method of claim 11, wherein the optical beam is passed
2 through ~~the~~ at least four optical-amplifier slabs ~~and passed within about 1 degree~~
3 of a Brewster angle of the slab surfaces, wherein half of the at least four optical-
4 amplifier slabs are ~~slanting~~ slanted in one direction and half of the at least four
5 optical-amplifier slabs ~~have an opposite slant~~ are slanted in an opposite direction,
6 ~~wherein the~~ using opposite slanting half of the at least four optical-amplifier slabs
7 being configured to control ~~avoids beam spreading in of the an~~ output beam.

1 17. (New) The method of claim 10, wherein the at least two optical-amplifier slabs are
2 each wedge-shaped.

1 18. (New) An amplification system, comprising:
2 a plurality of wedge-shaped slabs each having a thickness dimension of less than
3 1 centimeter and two slab surfaces that are slightly non-perpendicular to a
4 thickness dimension, the plurality of wedge-shaped slabs disposed such
5 that facing slab surfaces of adjacent wedge-shaped slabs are slightly non-
6 parallel and the wedge-shaped slabs are separated by an intervening
7 volume;
8 a cooling fluid in the intervening volume between the adjacent wedge-shaped
9 slabs; and
10 a polarized input beam passed through the slab surfaces of the wedge-shaped
11 slabs near a Brewster angle.

1 19. (New) The amplification system of claim 18, wherein the slab surfaces include an
2 anti-reflection surface coating.

1 20. (New) The amplification system of claim 18, wherein half of the slab surfaces of the
2 wedge-shaped slabs are slanted in one direction and half of the slab surfaces of
3 the wedge-shaped slabs are slanted in an opposite direction, the opposite slanting
4 slab surfaces of the wedge-shaped slabs being configured to control spreading of
5 an output beam.

1 21. (New) The amplification system of claim 18, wherein one of the slab surfaces of the
2 wedge-shaped slabs includes a grating.

1 22. (New) The amplification system of claim 18, wherein the polarized input beam has a
2 wavelength of between 1400 nm and 1800 nm.

1 23. (New) The amplification system of claim 18, wherein the thickness dimension of
2 each wedge-shaped slab is less than 3 mm.